

Homework 1 (MATH 5320-01)**Name (Print):****Due date: Tuesday, Feb. 10, 2009**

1. Three insurance companies offer investors insurance bonds earning simple and compound interest at different rates, respectively.
 - Company A offers simple interest at a rate of 6%.
 - Company B offers compound interest at a rate of 4% and a conversion period of one month.
 - Company C offers compound interest at a rate of 4% and a conversion period of three months.
 - a) Describe in detail the difference equation and its solution for the cases of simple and compound interest, respectively.
 - b) For any principal S_0 , calculate for all the three cases the amount on deposit after 5, 10, 15, and 20 years.
 - c) Which of the three offers maximizes the amount on deposit after 5 years?
 - d) Which of the three offers maximizes the amount on deposit after 20 years?

2. Consider Samuelson's model for the national income:
$$y_{n+2} = A(1 + B)y_{n+1} - AB y_n + 1$$
 - a) Calculate the analytical solution for this model.
 - b) Calculate for a particular choice of the parameters A and B the numerical solution.
Show that the numerical solution agrees with the analytical solution.
 - c) Discuss the effect of variations of A and B.
 - d) Explain why this model is used to account for memory effects.